

Appropriate Assessment Screening for Seven Farm Underpasses and a Car Park along the Great Southern Greenway

Prepared on behalf of the Limerick City and County Council by Rory Dalton



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Executive Summary

The current report determines, through the Appropriate Assessment process, that the construction and operational phases of the 7 cattle underpasses and a car park along the Great Southern Greenway outlined in Section 3.3 of this document will not have a significant impact on any Natura 2000 Sites in the area. The tables in Section 4 detail the potential impacts to each conservation interest of each Natura 2000 Site within a 15km radius of each item assessed.

The scale of the works at each proposed underpass is small, and underpasses are to be built largely within the footprint of pre-existing hard stands of the greenway and the individual farm roads at each crossing. The scale of the works for the car park, though larger, will be within the outskirts of Newcastle West, and will be of a similar scale and nature to the commercial, private and state properties typical of the area. Disruption from machinery during construction will be short term, and will not be elevated greatly above the usual levels of machine operation at these busy farm crossings or at the site of the proposed car park. The operational phase of the underpasses will essentially be the same as their current state.

While both projects are independent their cumulative effects are considered together for the purposes of this report.

1. Introduction

Rory Dalton Ecology was appointed by Fehily Timoney and Company on behalf of Limerick City and County Council to undertake an Appropriate Assessment Screening for work to be completed along the Great Southern Greenway. The work consists of seven underpasses and a car park. The underpasses are being put in place to cater for the movement of cattle and farm machinery within the more intensive farms which straddle the Greenway, as the mud and slurry typical of a cattle crossing would impede foot passage and would quickly become an unsightly element of the Greenway. The proposal seeks to provide parking for the users of the greenway. A designated car park will cater for existing numbers, and will facilitate the expected rise in the number of people using the greenway.

This Appropriate Assessment (AA) Screening Report outlines the results of a Habitats Directive Stage 1 Screening Assessment for the proposed work. This AA Screening report of the proposed project has been undertaken in order to comply with the requirements of the Habitats Directive Article 6(3). The function of this Screening Statement is to provide information that will facilitate the competent authority in completing a Stage 1 Screening Assessment of the proposed project's potential to result in likely significant effects to the Conservation Objectives of Natura 2000 Sites either alone or in-combination with other plan or projects.

1.1. Appropriate Assessment Process

An Appropriate Assessment is undertaken to establish if any proposed plan or project is likely to have a significant effect or impact on any site that has been designated under: the E.U. Habitats Directive (92/43/EEC) i.e. SAC; or the E.U. Birds Directive (79/409/EEC as amended 2009/147/EC) i.e. SPA. Collectively, SAC's and SPA's are known as Natura 2000 sites. The need to undertake one or more stages of this process has arisen from Articles 6(3) and 6(4) of the aforementioned Habitats Directive; where the former Article is primarily concerned with the protection of sites from likely significant effects and the latter allows derogation from such protection in very specific circumstances involving imperative reasons of overriding public interest.

Article 6(3) of the Habitats Directive requires that:

“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

And Article 6(4) of the Habitats Directive requires that:

“If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.”

In Stage 1, a screening process is undertaken to identify likely significant effects on a Natura 2000 site are likely to arise from the project or plan in question. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves on to Stage 2 where an AA considers potential mitigation measures for adverse effects. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse effects on a Natura 2000 site then an assessment of alternative solutions is considered in Stage 3. This is then followed by Stage 4 in the event that adverse effects remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS). While an AA NIS is provided by the advocate of the plan or project in question, the AA NIS itself is undertaken by the competent authority.

2. Methodology

Documents associated with the proposed project and relevant ecology databases were consulted as part of this assessment, with a site walkover also undertaken. Furthermore, the following guidelines were used in the completion of this assessment;

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the ‘Habitats’ Directive 92/43/EEC (European Commission 2001).
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual (EPA 2013).
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009).
- European Commission (2018). Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. Brussels, 21.11.2018 C(2018) 7621 final.

The Screening Stage of Appropriate Assessment is used to identify whether the Plan, either alone or in combination with other plans or projects, is likely to have a significant effect on a Natura 2000 site. This report follows European Commission (2001) guidance which recommends that screening should follow a four step process as outlined below:

1. : Determine whether the plan is directly connected with or necessary to the management of the site. If it is, then no further assessment is necessary.
2. : Describe the plan and other plans and projects that, ‘in combination’, have the potential to have significant effects on a European site.
3. : Identify the potential effects on the European site.
4. : Assess the significance of any effects on the European site.

3. Brief Description of the Sites and Proposed works

3.1 Site Description and Location

The proposed car park is located on the outskirts of Newcastle West just off of Station Road adjacent to the Newcastle West Recycling Centre. The car park is to be situated at ITM 528009 634687, on the confluence of the eastbound and westbound lines from Newcastle West Station on the former Great Southern Railway’s Limerick to Tralee line. The current proposal seeks to provide parking for the users of the greenway.

The cattle underpasses are located in the townlands of Garranekeevane (Underpass 1), Dromin (Underpasses 2A and 2B), Ballymurragh West (Underpasses 3 and 4), Moysha (Underpass 6) and Islandboy West (underpass 7).

All items presented for Appropriate Assessment are situated on the Great Southern Railway’s Limerick to Tralee line, which is also known as the ‘North Kerry Line’. In 1880 the line from Limerick to Barnagh and onto Tralee opened providing a link for the transport of both passengers and goods. The North Kerry Line ceased to carry passengers in 1963, however the line continued to carry goods traffic until 1977. The tracks of the Limerick to Tralee line were finally removed in 1988. The line has since become a Greenway providing amenity to locals.

3.2 Site Visit

Site visits were carried out on the 28th, 29th and the 30th of September 2020 during which the existing environment was studied in relation to the proposed works put forward by Limerick County Council. The particulars of these site visits are outlined in the table below

Date	Weather	Surveyor
28 th September 2020	Temperature: 20 - 21 degrees Celsius Rain: None, however it rained immediately after the survey Cloud: 8/8 Wind: F1 in the open, F0 in the woodland	Rory Dalton
29 th September 2020	Temperature: 15 degrees Celsius Rain: None Cloud: 6/8 Wind: F3	Rory Dalton
30 th September 2020	Temperature: 18 - 22 degrees Celsius Rain: None Cloud: 6/8 Wind: F1 in the open, F0 in the woodland	Rory Dalton

3.3 Proposed Works

The proposed works will vary slightly at each crossing according to the topography at each site, however the general principals will remain the same. It is intended to build up the level of the road to allow for passage underneath. Then, where the existing railway/greenway track is elevated above the surrounding landscape, it is intended to dig through the existing railway/greenway track to allow for passage underneath the road. In most cases it will be a mixture of digging through as far as is suited for each particular situation, and then making up the remaining clearance by building the road higher. For this, works will consist of the import and compaction of acceptable fill material to make up the gradient for the overpass. The walls of the underpass will consist of pre-cast concrete, in some cases a large pre-cast concrete culvert. Drainage will be via a low gradient swale and/or soakpit.

The scale of the works at each proposed underpass is small, and underpasses are to be built largely within the footprint of pre-existing hard stands of the greenway and the individual farm roads at each crossing. Disruption from machinery during construction will be short term, and will not be elevated greatly above the usual levels of machine operation at these busy farm crossings.

The proposed works at the car park site will be as follows:

Site Clearance: Clearance of vegetation, removal of topsoil and levelling off of subsoil with mechanical excavator and dumper.

Utility Services: Diversion and protection of existing services

Drainage: Sustainable Urban Drainage System (SUDS) storm water drainage system, with attenuation tank, oil interceptor & infiltration system.

Earth works: Import and compaction of acceptable fill material to moderate the existing gradient.

Fencing & Kerbs: Concrete post and timber infill panel fencing on the western boundary.

Landscaping: Top soiling and planting

Pavement: 804 sub-base with an Asphalt paving

Ancillary Works: Road marking, lighting, signage, CCTV

4. Natura 2000 Sites and the Potential for Negative Effects

4.1 Underpass 1

The following table identifies the Natura 2000 Sites to be included for assessment

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Proposed works would be, at the closest point, 4.6km from this SPA	Proposed works within 15km of the protected area
Lower River Shannon SAC (002165)	Proposed works would be, at the closest point, 8.1km from this site	Proposed works within 15km of the protected area
Askeaton Fen Complex SAC (0002279)	Proposed works would be 12.5km from this SAC	Proposed works within 15km of the protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (<i>Circus cyaneus</i>)	No significant negative effects are envisaged for foraging or nesting hen harrier. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at approximately 30km via soakage to the Daar Stream and then the River Deel until it reaches the SAC at the Shannon Estuary north of Askeaton - given the scale of the project, and the lack of direct hydrological connection, it is safe to say these habitats won't be effected.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
[1410] Mediterranean Salt Meadows	No		

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
	[6410] Molinia Meadows		No
	[3260] Floating River Vegetation	The conservation objectives supporting document: “ <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation (habitat code 3260)</i> ” shows that the closest floating river vegetation community of note within the SAC is on the Maigue, which is in a different catchment and theretofore not hydrologically connected. There will be no significant effects on this habitat.	No
	[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat as it does not exist onsite. Additionally, due to the scale and nature of the project, any alluvial forests within the catchment of the works will not be affected.	No
	[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Does not exist within the catchment of the works	No
	[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as the lack of direct hydrological connectivity between the site and a watercourse	No
	[1096] Brook Lamprey (<i>Lampetra planeri</i>)		No
	[1099] River Lamprey (<i>Lampetra fluviatilis</i>)		No
	[1106] Atlantic Salmon (<i>Salmo salar</i>)		No
	[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Does not exist within the catchment of the works	No
	[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit. The closest watercourse is approximately 400m away (the Daar Stream)	No
Askeaton Fen Complex SAC (0002279)	[7210] Cladium Fens	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works, nor is the Site hydrologically connected to these habitats.	No
	[7230] Alkaline Fens		No

4.2 Underpasses 2a and 2b

The following table identifies the Natura 2000 Sites to be included for assessment

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Proposed works would be, at the closest point, 1.2km from this SPA	Proposed works within 15km of the protected area
Lower River Shannon SAC (002165)	Proposed works would be, at the closest point, 5.1km from this site	Proposed works within 15km of the protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area each Natura 200 site and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (<i>Circus cyaneus</i>)	No significant negative effects are envisaged for this species. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works; although there is scrub within the footprint, it is not suitable for nesting hen harrier due to high disturbance rates by walkers and land owners.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at approximately 35km via soakage to the Cullinagh Stream and then the River Deel until it reaches the SAC at the Shannon Estuary north of Askeaton - given the scale of the project, and the lack of direct hydrological connection, it is safe to say these habitats won't be impacted.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
	[1410] Mediterranean Salt Meadows		No
	[6410] Molinia Meadows		No
[3260] Floating River Vegetation	The conservation objectives supporting document: "Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (habitat code 3260)" shows that the closest floating river	No	

		vegetation community of note within the SAC is on the Maigue, which is in a different catchment and theretofore not hydrologically connected. No effect for this habitat is envisaged.	
	[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat as it does not exist onsite. Additionally, due to the scale and nature of the project, any alluvial forests within the catchment of the works will not be affected.	No
	[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Does not exist within the catchment of the works	No
	[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as the lack of direct hydrological connectivity between the site and a watercourse	No
	[1096] Brook Lamprey (<i>Lampetra planeri</i>)		No
	[1099] River Lamprey (<i>Lampetra fluviatilis</i>)		No
	[1106] Atlantic Salmon (<i>Salmo salar</i>)		No
	[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Does not exist within the catchment of the works	No
	[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit. The closest watercourse is approximately 100m away and is a small second order stream which would most likely only rarely be visited by otter.	No

4.3 Underpasses 3 and 4

The following table identifies the Natura 2000 Sites to be included for assessment

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Each of these proposed underpasses would be 70m from this SPA	Proposed works within 15km of the protected area
Lower River Shannon SAC (002165)	Each of these proposed underpasses would be 5km from this SAC as a direct measurement, however, the hydrological connection is estimated at 7-8km due to the meanders in the river	Proposed works within 15km of the protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area each Natura 200 site and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (Circus cyaneus)	No significant negative effects are envisaged for this species. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works; although there is scrub within the footprint, it is not suitable for nesting hen harrier due to high disturbance rates by walkers and land owners.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at over 60km via 300m of soakage to the Eoghaun Stream, the Allaghaun River, the River Feale until it reaches the estuary of the Cashen - given the scale of the project, and the lack of direct hydrological connection, it is safe to say these habitats won't be affected.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
	[1410] Mediterranean Salt Meadows		No
	[6410] Molinia Meadows		No

[3260] Floating River Vegetation	The conservation objectives supporting document: “ <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation (habitat code 3260)</i> ” shows that the closest floating river vegetation community of note within the SAC is on the Maigue, which is in a different catchment and theretofore not hydrologically connected. Pockets of the habitat subtype “Bryophyte-rich streams and rivers” may exist in the catchment, however the scale and nature of the works are too small to cause any effects to this habitat, particularly given the lack of direct hydrological connection.	No
[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat as it does not exist onsite. Additionally, due to the scale and nature of the project, any alluvial forests within the catchment of the works will not be affected.	No
[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Does not exist within the catchment of the works	No
[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	The proposed underpasses are too far upstream to be a threat to this anadromous species and so no significant negative effects are envisaged	No
[1096] Brook Lamprey (<i>Lampetra planeri</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as the lack of direct hydrological connectivity between the site and a watercourse	No
[1099] River Lamprey (<i>Lampetra fluviatilis</i>)	The proposed underpasses are too far upstream to be a threat to this anadromous species and so no significant negative effects are envisaged	No
[1106] Atlantic Salmon (<i>Salmo salar</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project as well as the lack of direct hydrological connectivity between the site and a watercourse	No
[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Does not exist within the catchment of the works	No
[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit. The closest watercourse is approximately 300m away	No

4.4 Underpass 6

The following table identifies the Natura 2000 Sites to be included for assessment

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	The proposed underpass would be 1.5km from this SPA	Proposed works within 15km of the protected area
Lower River Shannon SAC (002165)	The proposed underpass would be 208m from this SAC	Proposed works within 15km of the protected area
Moanveanlagh Bog SAC (002351)	The proposed underpass would be 8.7km from this SAC	Proposed works within 15km of the protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area each Natura 2000 site and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (<i>Circus cyaneus</i>)	No significant negative effects are envisaged for this species. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works; although there is scrub within the footprint, it is not suitable for nesting hen harrier due to high disturbance rates by walkers and land owners.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at over 40km via 250m of low gradient drainage ditch (which was dry during surveying) to the Oolagh River, then to the River Feale until it reaches the estuary of the Cashen - given the scale of the project, and the lack of direct hydrological connection, it is safe to say these habitats won't be affected.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
	[1410] Mediterranean Salt Meadows		No
[6410] Molinia Meadows	No		

	[3260] Floating River Vegetation	The conservation objectives supporting document: “ <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation (habitat code 3260)</i> ” shows that the closest floating river vegetation community of note within the SAC is on the Maigue, which is in a different catchment and therefore not hydrologically connected. Pockets of the habitat subtype “Bryophyte-rich streams and rivers” may exist in the catchment, however the scale and nature of the works are too small to cause any impacts to this habitat, particularly given the lack of direct hydrological connection.	No
	[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat as it does not exist onsite. Additionally, due to the scale and nature of the project, any alluvial forests within the catchment of the works will not be affected.	No
	[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Does not exist within the catchment of the works	No
	[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as the weak hydrological connectivity between the site and a watercourse	No
	[1096] Brook Lamprey (<i>Lampetra planeri</i>)		No
	[1099] River Lamprey (<i>Lampetra fluviatilis</i>)		No
	[1106] Atlantic Salmon (<i>Salmo salar</i>)		No
	[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Does not exist within the catchment of the works	No
	[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit. The closest watercourse is approximately 250m away with good cover and connectivity through a overgrown drainage ditch and so it would be seen as a good area for an otter holt, however none was found.	No
Moanveanlagh Bog SAC (002351)	[7110] Raised Bog (Active)*	No significant negative effects are envisaged for these habitats due to the scale and nature of the underpass, the distance between the underpass and the SAC, as well as the fact that there is no hydrological connectivity between the underpass and this SAC.	No
	[7120] Degraded Raised Bog		No
	[7150] Rhynchosporion Vegetation		No

4.5 Underpass 7

The following table identifies the Natura 2000 Sites to be included for assessment

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	The proposed underpass would be 974m from this SPA	Proposed works within 15km of the protected area
Lower River Shannon SAC (002165)	The proposed underpass would be 551m from this SAC	Proposed works within 15km of the protected area
Moanveanlagh Bog SAC (002351)	The proposed underpass would be 7.1km from this SAC	Proposed works within 15km of the protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area each Natura 2000 site and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Effects	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (<i>Circus cyaneus</i>)	No significant negative effects are envisaged for this habitat. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works; although there is scrub within the footprint, it is not suitable for nesting hen harrier due to high disturbance rates by walkers and land owners.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at over 40km via 250m soakage the River Feale until it reaches the estuary of the Cashen - given the scale of the project, and the weak hydrological connection, it is safe to say these habitats won't be impacted.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No
	[1410] Mediterranean Salt Meadows		No

	[6410] Molinia Meadows		No
	[3260] Floating River Vegetation	The conservation objectives supporting document: “ <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation (habitat code 3260)</i> ” shows that the closest floating river vegetation community of note within the SAC is on the Maigue, which is in a different catchment and therefore not hydrologically connected. Pockets of the habitat subtype “Bryophyte-rich streams and rivers” may exist in the catchment, however the scale and nature of the works are too small to cause any impacts to this habitat, particularly given the lack of direct hydrological connection.	No
	[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat as it does not exist onsite. Additionally, due to the scale and nature of the project, any alluvial forests within the catchment of the works will not be effected.	No
	[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Does not exist within the catchment of the works	No
	[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as the lack of direct hydrological connectivity between the site and a watercourse	No
	[1096] Brook Lamprey (<i>Lampetra planeri</i>)		No
	[1099] River Lamprey (<i>Lampetra fluviatilis</i>)		No
	[1106] Atlantic Salmon (<i>Salmo salar</i>)		No
	[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Does not exist within the catchment of the works	No
	[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit.	No
Moanveanlagh Bog SAC (002351)	[7111] Raised Bog (Active)*	No significant negative effects are envisaged for these habitats due to the scale and nature of the underpass as well as the fact that there is no hydrological connectivity between the underpass and this SAC.	No
	[7121] Degraded Raised Bog		No
	[7151] Rhynchosporion Vegetation		No

4.6 The Car Park in Newcastle West

Natura Site	Distance	Reason for Inclusion in the current Screening
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	Proposed works would be, at the closest point, 4.67km from this SPA	Proposed works within 15km of protected area
Lower River Shannon SAC (002165)	Proposed works would be, at the closest point, 8.14km from this site	Proposed works within 15km of protected area
Askeaton Fen Complex SAC (0002279)	Proposed works would be 13.57km from this SAC	Proposed works within 15km of protected area

The following table assesses the potential for effects to each individual conservation interest of each Natura 2000 site within 15km of the study area and thereby determines the need for mitigation and further analysis through Stage 2 NIS

Natura 2000 Site	Conservation Interest	Assessment of Potential Impacts	Mitigation required
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	[A082] Hen Harrier (<i>Circus cyaneus</i>)	No significant negative effects are envisaged for foraging or nesting Hen Harrier habitat. Potential nesting or foraging habitat does not exist within or adjacent to the footprint of the proposed works.	No
Lower River Shannon SAC (002165)	[1110] Sandbanks	No significant negative effects are envisaged for these habitats. These habitats do not exist within the footprint of the works. The closest possible hydrological connection to these habitats is estimated at approximately 30km via 600m distance of groundwater soakage to the Daar Stream and then the River Deel until it reaches the SAC at the Shannon Estuary north of Askeaton - given the scale of the project, and the weak hydrological connection, these habitats won't be impacted. There shall be no effects on these habitats.	No
	[1130] Estuaries		No
	[1140] Tidal Mudflats and Sandflats		No
	[1150] Coastal Lagoons*		No
	[1160] Large Shallow Inlets and Bays		No
	[1170] Reefs		No
	[1220] Perennial Vegetation of Stony Banks		No
	[1230] Vegetated Sea Cliffs		No
	[1310] Salicornia Mud		No
	[1330] Atlantic Salt Meadows		No

	[1410] Mediterranean Salt Meadows		No
	[6410] Molinia Meadows		No
	[3260] Floating River Vegetation	The conservation objectives supporting document: “ <i>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion</i> vegetation (habitat code 3260)” shows that the closest floating river vegetation community protected within the SAC is on the Maigue, which is in a different catchment and therefore not hydrologically connected to the proposed development. There shall be no effects on this habitat.	No
	[91E0] Alluvial Forests*	No significant negative effects are envisaged for this habitat due to the scale and nature of the project.	No
	[1029] Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	Freshwater Pearl Mussel do not occur within the catchment of the works.	No
	[1095] Sea Lamprey (<i>Petromyzon marinus</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as lack of a hydrological connection between the site and a watercourse	No
	[1096] Brook Lamprey (<i>Lampetra planeri</i>)	No significant negative effects are envisaged for this species due to the scale and nature of the project, as well as lack of a hydrological connection between the site and a watercourse	No
	[1099] River Lamprey (<i>Lampetra fluviatilis</i>)	No significant negative impacts are envisaged for this species due to the scale and nature of the project, as well as lack of a hydrological connection between the site and a watercourse	No
	[1106] Atlantic Salmon (<i>Salmo salar</i>)	No significant negative impacts are envisaged for this species due to the scale and nature of the project as well as lack of a hydrological connection between the site and a watercourse	No
	[1349] Bottle-nosed Dolphin (<i>Tursiops truncatus</i>)	Bottle-nosed Dolphin do not occur within the catchment of the works	No
	[1355] Otter (<i>Lutra lutra</i>)	No mammal burrow found within the footprint of the proposed works during the site visit. The closest watercourse is approximately 600m away (the Daar Stream)	No
Askeaton Fen Complex SAC (0002279)	[7211] Cladium Fens	No significant negative impacts are envisaged for this habitat. This habitat does not exist within the footprint of the works, nor is the site hydrologically connected to this habitat, nor is the Site hydrologically connected to these habitats.	No
	[7230] Alkaline Fens		No

5. Summary Table

The following table shows, at a glance, which Natura 2000 Sites were included for the individual assessment of each underpass & the car park.

	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	Lower River Shannon SAC	Askeaton Fen Complex SAC	Moanveanlagh Bog SAC	Significant Impacts Expected to a Natura 2000 Site
Underpass 1	√	√	√	-	No
Underpass 2a	√	√	-	-	No
Underpass 2b	√	√	-	-	No
Underpass 3	√	√	-	-	No
Underpass 4	√	√	-	-	No
Underpass 6	√	√	-	√	No
Underpass 7	√	√	-	√	No
NCW Car Park	√	√	√		No

6. Conclusion

It is concluded beyond reasonable scientific doubt that there are not likely to be significant effects from the proposed development on three the European sites identified for consideration (or any other European site beyond 15km) either alone or in combination with other plans or projects. No effects on the European Sites listed below are predicted. Therefore, the following three European sites have been 'screened out' within the Stage 1: Appropriate Assessment Screening Report:

- Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)
- Lower River Shannon SAC (002165)
- Askeaton Fen Complex SAC (0002279)
- Moanveanlagh Bog SAC (002351)

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NPWS (2013) Site Synopsis: Lower River Shannon SAC (site code 2165) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2014) Site Synopsis: Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Conservation Objectives: Askeaton Fen Complex SAC (0002279) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Site Synopsis: Askeaton Fen Complex SAC (0002279) National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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8. Synopsis of Relevant Sites

8.1 Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA Site Synopsis

The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is a very large site centred on the borders between the counties of Cork, Kerry and Limerick. The site is skirted by the towns of Newcastle West, Ballydesmond, Castleisland, Tralee and Abbeyfeale. The mountain peaks included in the site are not notably high or indeed pronounced, the highest being at Knockfeha (451 m). Other mountains included are Mount Eagle, Knockanefune, Garraunbaun, Taur, Rock Hill, Knockacummer, Mullaghmuish, Knight's Mt, Ballincollig Hill, Beennageeha Mt, Sugar Hill, Knockanimpuba and Knockathea, amongst others. Many rivers rise within the site, notably the Blackwater, Owentaraglin, Owenkeal, Glenlara, Feale, Clydagh, Allaghaun, Allow, Oolagh, Galey and Smerlagh. The site consists of a variety of upland habitats, though almost half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clear-fell are also present at any one time. The principal tree species present are Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta*). A substantial part (28%) of the site is unplanted blanket bog and heath, with both wet and dry heath present. The vegetation of these habitats is characterised by such species as Ling Heather (*Calluna vulgaris*), Bilberry (*Vaccinium myrtillus*), Common Cottongrass (*Eriophorum angustifolium*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Deergrass (*Scirpus cespitosus*) and Purple Moor-grass (*Molinia caerulea*). The remainder of the site is mostly rough grassland that is used for hill farming. This varies in composition and includes some wet areas with rushes (*Juncus* spp.) and some areas subject to scrub encroachment.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for Hen Harrier. This SPA is a stronghold for Hen Harrier and supports the largest concentration of the species in the country. A survey in 2005 recorded 45 pairs, which represents over 20% of the all-Ireland total. A similar number of pairs had been recorded in the 1998-2000 period. The mix of forestry and open areas provides optimum habitat conditions for this rare bird, which is listed on Annex I of the E.U. Birds Directive. The early stages of new and second-rotation conifer plantations are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath. Hen Harriers will forage up to c. 5 km from the nest site, utilising open bog and moorland, young conifer plantations and hill farmland that is not too rank. Birds will often forage in openings and gaps within forests. In Ireland, small birds and small mammals appear to be the most frequently taken prey. Short-eared Owl, a very rare species in Ireland, has been known to breed within the site. Nesting certainly occurred in the late 1970s and birds have been recorded intermittently since. The owls are considered to favour this site due to the presence of Bank Voles, a favoured prey item. Merlin also breed within the site but the size of the population is not known. Red Grouse is found on some of the unplanted areas of bog and heath – this is a species that has declined in Ireland and is now Red-listed. The Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is of ornithological importance because it provides excellent nesting and foraging habitat for breeding Hen Harrier and is one the top sites in the country for the species. The presence of three species, Hen Harrier, Merlin and Short-eared Owl, which are listed on Annex I of the E.U. Birds Directive is of note.

8.2 Askeaton Fen Complex SAC Site Synopsis

Askeaton Fen Complex consists of a number of small fen areas to the east and southeast of Askeaton in Co. Limerick. This area has a number of undulating hills, some of which are quite steep, and is underlain by Lower Carboniferous Limestone. At the base of the hills a series of fens/reedbeds/loughs can be found, often in association with marl or peat deposits. At the south-east of Askeaton, both Cappagh and Ballymorisheen fens are surrounded by large cliff-like rocky limestone outcrops.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7210] Cladium Fens*

[7230] Alkaline Fens

In Askeaton Fen Complex SAC a diversity of fen types are represented in a gradation from open water to drier seepage areas. One of the more important fen types, Cladium fen, which contains Great Fen-sedge (*Cladium mariscus*), occurs in various forms and is the most common fen type within the SAC. It is associated with wet conditions generally not >25 cm deep and can be found in mono-dominant stands growing on a marl base, such as at Feereagh and Mornane Loughs, and in the fen in the townland of Mornane. It can also be co-dominant with Common Reed (*Phragmites australis*) in slightly drier conditions, such as in Deegerty, Blind Lough and Dromlohan. It is also found in association with alkaline fen species such as Black Bog-rush (*Schoenus nigricans*) where it grows on a peaty substrate. Cladium fen is indicative of extremely base rich conditions. Typical species seen growing with the Great Fen-sedge include pondweeds (*Potamogeton* spp.), Marsh Horsetail (*Equisetum palustre*), Water Horsetail (*E. fluviatile*), Lesser Water-parsnip (*Berula erecta*), Lesser Marshwort (*Apium innundatum*), Bottle Sedge (*Carex rostrata*), particularly where marl is present, and Water Mint (*Mentha aquatica*). One such area of fen within the site is the only known location in Ireland for the water beetle *Hygrotus decoratus* and is also known to contain *Hydroporus scalesianus*, a rare water beetle indicative of undisturbed fens. At the edge of some of the Great Fen-sedge fens, particularly where improved grassland is not present, there is typically found a gradation to wet marsh, which in turn grades into wet grassland. These transition habitats add to the ecological diversity of the site.

Alkaline fen is characterised by the presence of Black Bog-rush in association with brown mosses and a small sedge community. The soil is permanently waterlogged but generally not flooded unless for a short period. Examples of this fen type are found at the edge of almost all the sites, but its extent is much less than the Great Fen-sedge fen type within the SAC. The fen in the townlands of Moig West and Graigues is a good example of alkaline fen. Species seen growing with Black Bogrush include Purple Moor-grass (*Molinia caerulea*), Long-stalked Yellow-sedge (*Carex lepidocarpa*), Carnation Sedge (*C. panicea*), rushes (*Juncus* spp.) and an abundance of brown mosses, including *Campylium stellatum*, *Ctenidium molluscum*, *Calliergon cuspidatum* and *Bryum pseudotriquetrum*. This fen type also grades into marsh and wet grassland.

Scrub and woodland is present on high ground in some areas, such as Ballymorisheen, Blind Lough, Ballyvogue, Dromlohan and Lough Feereagh. Species include Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Ash (*Fraxinus excelsior*), willow (*Salix* sp.), Downy Birch (*Betula pubescens*) and Hazel (*Corylus avellana*). This is a useful faunal habitat particularly as it is adjacent to reedbeds and fens.

A small area of limestone species-rich grassland is found to the north of Balinvirick fen. Species found which are typically associated with the habitat include the Earlypurple Orchid (*Orchis mascula*), Carline Thistle (*Carlina vulgaris*) and Mountain Everlasting (*Antennaria dioica*).

Snipe use the tall marsh vegetation at the edge of the fens. Birds of prey such as Sparrowhawk feed over the reedbeds and scrubland areas of the site. Land use in the area is quite intensive, with improved grassland extending down relatively steep slopes to the edge of the fens/loughs. New drainage or the deepening of existing drains poses a threat to the aquatic habitats at the site. In some instances, the fens appear to be drying out. This site is of conservation value because it supports two fen types, each of which exhibit many sub-types. Cladium fen is listed as an Annex I priority habitat under the E.U. Habitats Directive. These wetland habitats of fen, reedbeds, open water, marsh and wet grassland are also valuable in that they supply a refuge for fauna in an otherwise intensively managed countryside.

8.3 Lower River Shannon SAC Site Synopsis

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarne. Rivers within the sub-catchment of the Mulkear include the Killeenagarraff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1110] Sandbanks
- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1150] Coastal Lagoons*
- [1160] Large Shallow Inlets and Bays
- [1170] Reefs
- [1220] Perennial Vegetation of Stony Banks
- [1230] Vegetated Sea Cliffs
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [6410] Molinia Meadows
- [91E0] Alluvial Forests*
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1349] Bottle-nosed Dolphin (*Tursiops truncatus*)
- [1355] Otter (*Lutra lutra*)

The Shannon and Fergus Rivers flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian rocks and the western stretches through Carboniferous limestone. The Mulkear flows through Lower Palaeozoic rocks in the upper reaches before passing through Namurian rocks, followed by Lower Carboniferous shales and Carboniferous limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigne River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulmasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary.

Both the Fergus and inner Shannon Estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulmasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some eelgrass (*Zostera* spp.) beds and patches of green algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community which has been noted from the inner Shannon and Fergus estuaries is a *MacomaScrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. For example, swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus*, *S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triquetra*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus estuary and at Ringmoyle Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glauca maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus estuary: a type of robust saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the species Common Saltmarsh-grass (*P. maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site, two of which have been surveyed as part of a National Inventory of Lagoons. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa*, *Cerastoderma glaucum*, *Lekanesphaera hookeri*, *Palaemonetes varians*, *Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of stonewort (*Chara canescens* and *Chara* cf. *connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Thrift and plantains (*Plantago* spp.). A rare endemic type of sealavender, *Limonium recurvum* subsp. *pseudotranswallianum*, occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Common Bird's-foot-trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top, and below this each of the shores has different characteristic species giving a range of different shore types.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of the Purple Sea Urchin *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps, to ridged bedrock with gullies of sand between the ridges, to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18 m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include stony beaches and bedrock shores (these support a typical zonation of seaweeds such as *Fucus* spp., *Ascophyllum nodosum* and kelps), shingle beaches (with species such as Sea Beet, Sea Mayweed - *Matricaria maritima*, Sea Campion and Curled Dock - *Rumex crispus*), sandbanks which are slightly covered by sea water at all times (e.g. in the area from Kerry Head to Beal Head) and sand dunes (a small area occurs at Beal Point, where Marram - *Ammophila arenaria* is the dominant species).

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon is broad, generally slow flowing and naturally eutrophic; the Fergus is smaller and alkaline; while the narrow, fast flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, but improved grassland is the most common habitat type. One grassland type of particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes (*Juncus* spp.) and sedges (*Carex* spp.), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*C. pallescens*).

Floating river vegetation characterised by species of water-crowfoot (*Ranunculus* spp.), pondweeds (*Potamogeton* spp.) and the moss *Fontinalis antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to Co. Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50 m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with Rusty Willow (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis*. The herbaceous layer consists of tall perennial herbs. A fringe of bulrush (*Typha* sp.) occurs on the river side of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash/alders woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species, with occasional Pedunculate Oak (*Quercus robur*), elm (*Ulmus glabra* and *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

While woodland is infrequent within the site, however Cahiracon Wood contains a strip of old oak woodland. Sessile Oak (*Q. petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmateia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim Mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2 km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of birch (*Betula* spp.), Hazel, oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora features prominent Great wood-rush and Bilberry (*Vaccinium myrtillus*), along with a typical range of woodland herbs. Bracken (*Pteridium aquilinum*) is a feature in areas where there is more light available.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north-east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, oak and birch. There is a good scrub layer with Hawthorn, willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open, with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The Hazel is actively coppiced in places.

There is a small area of actively regenerating cut-away raised bog at Ballyrorheen. It is situated approximately 5 km north-west of Cappamore in Co. Limerick. The bog contains some wet areas with good cover of bog mosses (*Sphagnum* spp.). Species of particular interest include Cranberry (*Vaccinium oxycoccos*) and White Sedge (*Carex curta*), along with two regionally rare mosses, including the bog moss *S. fimbriatum*. The site is being invaded by Downy Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of *Rhododendron ponticum* has greatly reduced the overall value of the site.

A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it passes through Limerick City, while Meadow Barley (*Hordeum secalinum*) is abundant in saltmarshes at Ringmoylan and Mantlehill. Hairy Violet (*Viola hirta*) occurs in the Askeaton/Foynes area. Golden Dock (*Rumex maritimus*) is noted as occurring in the River Fergus estuary. Finally, Bearded Stonewort (*Chara canescens*), a brackish water specialist, and Convergent Stonewort (*Chara connivens*) are both found in Shannon Airport Lagoon.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bartailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland Whitefronted Goose were regularly found, but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96), Teal (2,319; 1995-96), Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1,062; 1995/96), Curlew (1,504; 1995/96), Redshank (3,228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregrine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other

breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4,010 individuals at Loop Head, 1987).

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary. This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be 140 ± 12 individuals. Otter, a species also listed on Annex II of this Directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon, while the Mulkear catchment excels as a grilse fishery, though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of lamprey. Two additional fish species of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon. Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of land uses within the site. The most common use of the terrestrial parts is grazing by cattle, and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus estuary). Further, reclamation continues to pose a threat, as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale. In the past, cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds. Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory, except in the upper estuary where it reflects the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences of industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats

. Fishing is a main tourist attraction on the Shannon and there are a large number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitats lagoon and alluvial woodland, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U.

Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

8.4 Moanveanlagh Bog SAC

Moanveanlagh Bog is situated in Co. Kerry approximately 6 km east of Listowel, mainly within the townlands of Carhooeara and Bunagarha. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[7112] Raised Bog (Active)*

[7122] Degraded Raised Bog

[7152] Rhynchosporion Vegetation

Active raised bog comprises areas of high bog that are wet and actively peatforming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

This is a relatively flat site with some marginal areas that slope relatively steeply towards the cutover. There are a few large hummocks but over much of the site the micro-topography is very uniform. A flush area extends along the north and northeast of the site. In the south-west a bog burst has occurred and concentrically arranged tear pools can be seen, some of which are up to 12 m long. A swallow hole occurs near the middle of the site. Cutover bog occurs around the south-west, south and south-eastern margins of the high bog.

Much of the high bog has vegetation typical of a Western Raised Bog. The vegetation of the high bog is dominated by Bog Asphodel, White Beak-sedge, Cross-leaved Heath (*Erica tetralix*) and Carnation Sedge. Small patches of the moss *Racomitrium lanuginosum* and Common Lousewort (*Pedicularis sylvatica*) occur at the site. Purple Moor-grass (*Molinia caerulea*) is very common in the flush areas. The tear pools are mostly bare of vegetation but some support bladderwort (*Utricularia* sp.) and the bog mosses *S. cuspidatum* and *S. auriculatum*, with *S. papillosum* and the moss *Campylopus atrovirens* occurring at the pool edges. Towards the margins of the bog Bog-myrtle (*Myrica gale*) is frequent.

Current land uses on the site consist of a small area of peat-cutting at the margins and a low level of grazing by cattle in the north-east section of the high bog. Peatcutting has significantly declined since the 1970s. Other damaging operations include extensive fire damage, which is still occurring,

and the dumping of household refuse and cars around the high bog. These are all activities that have resulted in the loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability. This site also suffers from invasive species, with the shrub *Rhododendron* (*Rhododendron ponticum*) recorded on the western edge of the site and the carnivorous Pitcher Plant (*Sarracenia purpurea*) forming a large colony.

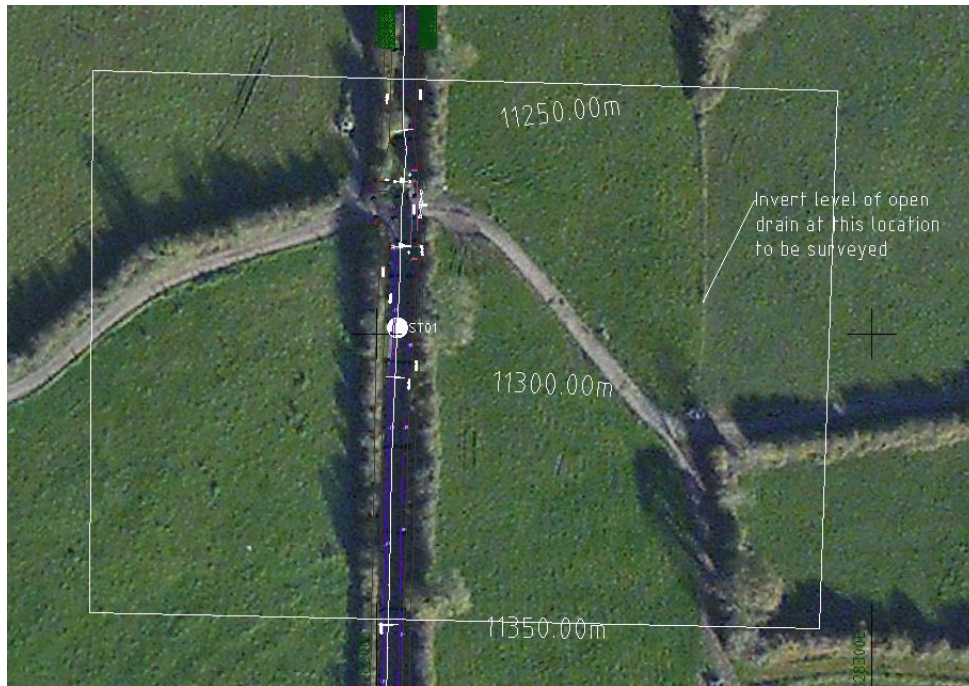
Moanveanlagh Bog is significant in terms of its geographical location as it is at the extreme south-western range of raised bogs in Ireland. Moanveanlagh Bog is a site of considerable conservation significance as it comprises a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including flushes. Active raised bog is listed as a priority habitat on Annex I of the E.U. Habitats Directive. Priority status is given to habitats and species that are threatened throughout the E.U. Ireland has a high proportion of the total E.U. resource of this habitat type (over 60%) and so has a special responsibility for its conservation at an international level.

9. Underpass Plan and Image

Underpass 1

Chainage: 11,290m

ITM Coordinates: 528205.7,636017.9



Underpass 2A

Chainage: 16,500m

ITM Coordinates: 524882.9,634396.7



Underpass 2B

Chainage: 16,900m

ITM Coordinates: 524658.8, 634192.4



Underpass 3

Chainage: 23,825m

ITM Coordinates: 520908.0,629540.0



Underpass 4

Chainage: 24,070m

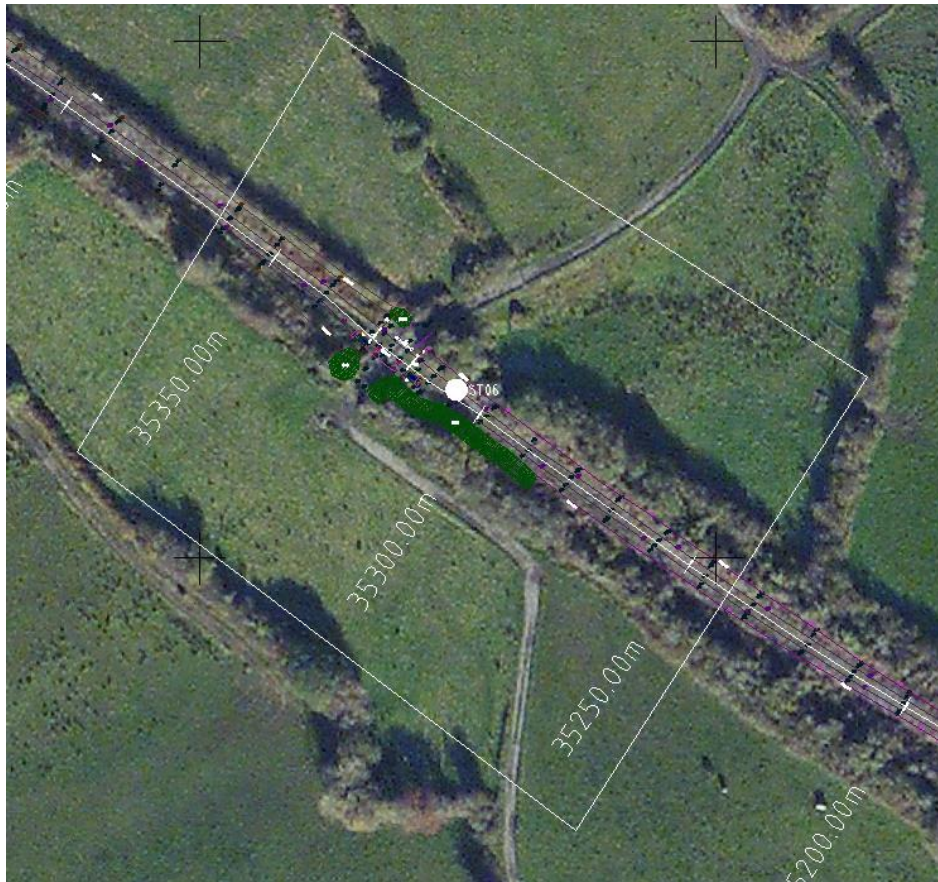
ITM Coordinates: 520666.0,629512.0



Underpass 6

Chainage: 35,305m

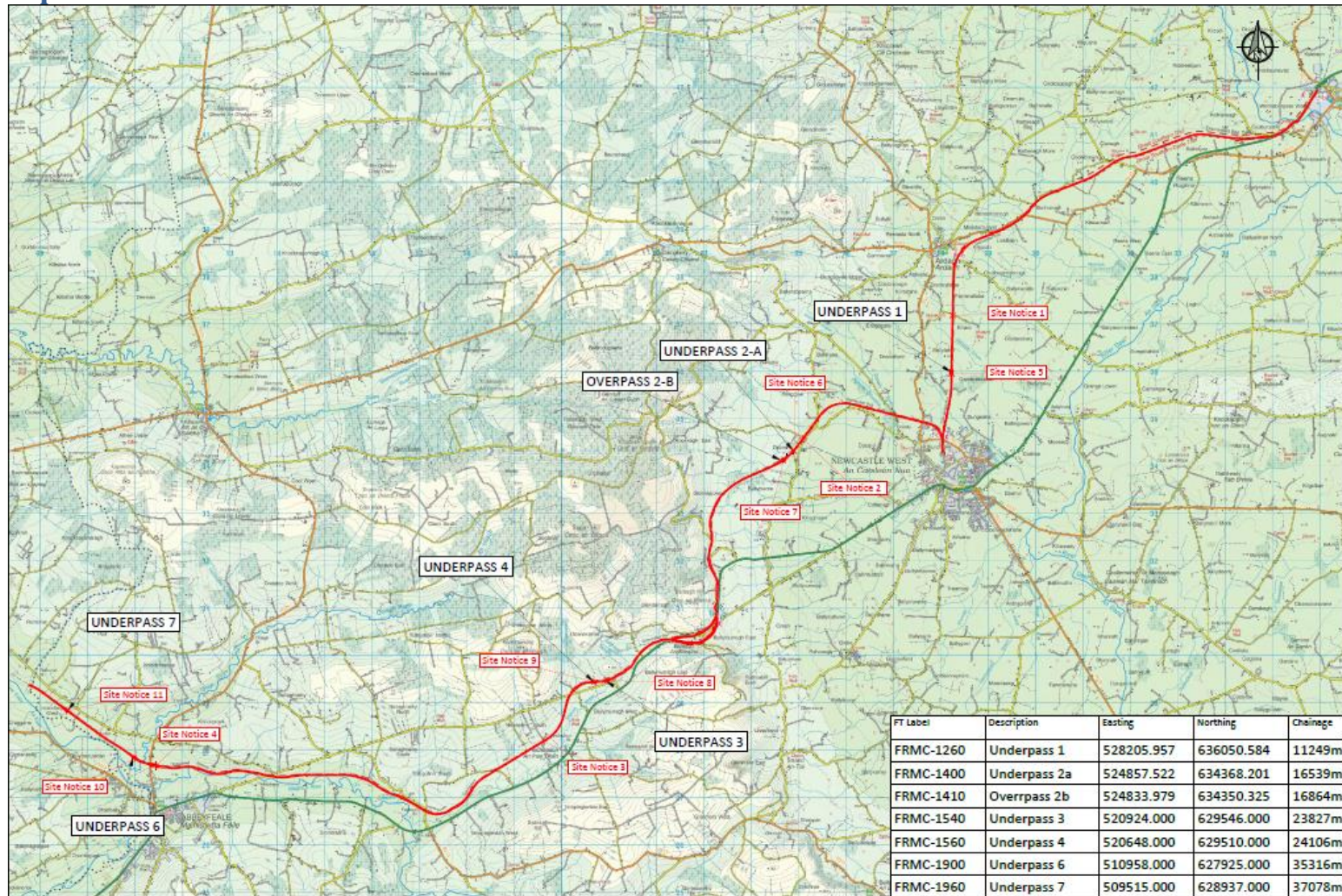
ITM Coordinates: 510942.6,627935.5



Underpass 7
Chainage: 37,005m
ITM Coordinates: 509559, 628905



10. Underpass Locations



11. Car Park Plan

